MATH 1550 Analytic Geometry and Calculus I Lec. 5 Lab. 0 Cr. 5

Effective Date: Spring 2008-2009

Course Description

Prerequisite: A grade of "C" or better in MATH 1022 or MATH 1023, or consent of the department. Credit will be given for only one of the following: MATH 1431, MATH 1550. Analytic geometry, limits, derivatives, integrals, and their applications.

Course Objectives

Students will:

1. Develop critical thinking and problem solving skills.
2. Understand the fundamentals of calculus as presented in the topical outline.

Procedures to Evaluate these Objectives

1. In-class problems after concept presentation
2. In-class exams
3. Cumulative final exam

Use of Results of Evaluation to Improve the Course

1. Student responses to in-class problems will be used to immediately help clarify any misunderstandings and to later adjust the appropriate course material.
2. All exams will be graded and examined to determine areas of teaching which could use improvement.
3. All evaluation methods will be used to determine the efficacy of the material presentation.

Detailed Topical Outline

1. The functions, their limits and continuity
   a. Evaluating and graphing functions
   b. Finding limits graphically, numerically, and with ε - δ techniques
   c. Evaluating limits analytically
   d. Continuity and one-sided limits
   e. Infinite limits
2. Differentiation
   a. The derivatives and the tangent lines
   b. Finding derivatives using the definition of a derivative
   c. Basic differentiation rules and rates of change
   d. The product and quotient rules and higher-order derivatives
   e. The chain rule
   f. Implicit differentiation
   g. Related rates and their applications as velocity and acceleration

3. Application of Differentiation
   a. Extrema on an interval
   b. Rolle's theorem and the Mean Value Theorem
   c. Increasing and decreasing functions and the first derivative test
   d. Concavity and the second derivative test
   e. Limits at infinity
   f. Curve sketching
   g. Newton's Method of finding real zeros of a function.
   h. Differentials and their applications
4. Integration
   a. Antiderivatives and indefinite integration
   b. Summations and sigma notation, and Area
   c. Reimann sums and definite integrals
   d. The Fundamental Theorem of calculus
   e. Numerical integration
5. Logarithmic, Exponential, and Transcendental Functions
   a. Differential of natural logarithmic functions
   b. Integration of natural logarithmic functions
   c. Inverse functions
   d. Differential and of integration of exponential functions.
   e. Solving differential equations
   f. Differentiation and integration of trigonometric functions.
6. Application of Integration
   a. Area of a region between two curves
   b. Volume by the disk method and the shell method
   c. Length of arc
   d. Volume of a solid of revolution
   e. Work
   f. Moments, centers of mass, and centroid
   g. Fluid pressure and fluid force